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Review Paper

Explaining trends in alcohol-related harms in Scotland 1991–2011 (II): policy, social norms, the alcohol market, clinical changes and a synthesis



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ABSTRACT

Objective: To provide a basis for evaluating post-2007 alcohol policy in Scotland, this paper tests the extent to which pre-2007 policy, the alcohol market, culture or clinical changes might explain differences in the magnitude and trends in alcohol-related mortality outcomes in Scotland compared to England & Wales (E&W).

Study design: Rapid literature reviews, descriptive analysis of routine data and narrative synthesis.

Methods: We assessed the impact of pre-2007 Scottish policy and policy in the comparison areas in relation to the literature on effective alcohol policy. Rapid literature reviews were conducted to assess cultural changes and the potential role of substitution effects between alcohol and illicit drugs. The availability of alcohol was assessed by examining the trends in the number of alcohol outlets over time. The impact of clinical changes was assessed in consultation with key informants. The impact of all the identified factors were then summarised and synthesised narratively.

Results: The companion paper showed that part of the rise and fall in alcohol-related mortality in Scotland, and part of the differing trend to E&W, were predicted by a model linking income trends and alcohol-related mortality. Lagged effects from historical deindustrialisation and socio-economic changes exposures also remain plausible from the available data.

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This paper shows that policy differences or changes prior to 2007 are unlikely to have been important in explaining the trends. There is some evidence that aspects of alcohol culture in Scotland may be different (more concentrated and home drinking) but it seems unlikely that this has been an important driver of the trends or the differences with E&W other than through interaction with changing incomes and lagged socio-economic effects. Substitution effects with illicit drugs and clinical changes are unlikely to have substantially changed alcohol-related harms: however, the increase in alcohol availability across the UK is likely to partly explain the rise in alcohol-related mortality during the 1990s. *Conclusions:* Future policy should ensure that alcohol affordability and availability, as well as socio-economic inequality, are reduced, in order to maintain downward trends in alcohol-related mortality in Scotland.

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Background

Alcohol policy in Scotland has been developed to address the rapid rise in alcohol-related mortality harms witnessed from the late 1980s to the early 2000s and the high levels that persist despite recent falls.¹ In order to assess the independent impact of policy brought together in the 2009 Alcohol Framework (but with some elements starting in 2007), we need to understand the extent to which the recent decline in alcohol-related mortality seen in Scotland (which began to decline prior to 2007), and differences in trends to England & Wales (E&W), might be explained by factors external to the alcohol strategy.

As there are several external factors to be explored, these have been considered over two papers. In the companion paper¹ we explored the role of income and the legacy of social, economic and political changes in the 1980s in explaining the differing levels and trends in alcohol-related mortality in Scotland and those in E&W. This paper explores the potential role of the remaining external factors: policy (the impacts of the 2002 plan for Action on Alcohol Problems and 2007 update, and the alcohol strategy/policy implemented in E&W); changes in alcohol culture (including drinking patterns and media discourse); changes in the alcohol market (including changes in alcohol availability and substitution effects between drugs and alcohol); and clinical changes (service quality and clinical coding). It then attempts to synthesise across the external factors examined in both papers to draw conclusions about their overall impact.

Methods

Defining the hypotheses

Alcohol policy

According to the model detailed in the companion paper,¹ alcohol policy can influence alcohol-related mortality through several mechanisms (e.g. availability and affordability of alcohol, cultural drinking norms and investment in alcohol services). UK-wide alcohol policy was set by the Westminster Government and shared across the UK until the devolution of power to the Scottish Parliament, Northern Irish and Welsh

Assemblies in 1999. Scotland has had a separate legal system throughout the period, although prior to devolution legislative changes were agreed by the Westminster Government. We have explored whether changes in alcohol policy over the last 30 years in Scotland and E&W may have contributed to the different trends observed between these regions.

Alcohol social norms

The shared alcohol social norms, both attitudinal and behavioural, of a community have been identified as factors likely to influence alcohol consumption (and therefore harms) at both an individual and population level.^{2,3} Here we define alcohol culture as both the shared attitudinal and behavioural norms in relation to alcohol, and which are part of the complex system (detailed in Figure 2 in the companion paper¹) which includes the influence of the alcohol industry and its associated marketing. The hypothesis is therefore that changes in alcohol culture might partly explain the trends in Scotland and the differences in trends to E&W.

Alcohol market

There are two hypotheses in this category. First, that because alcohol is a substitute (whereby a decrease in the consumption of other substances leads to an increase in alcohol consumption) or complement (whereby increased consumption of other substances leads to an increase in alcohol consumption) to other drugs, the changes in alcohol-related mortality in Scotland could be explained by changing consumption of substitutes or complements.^{h,4} Second, that alcohol availability (either in terms of the quantity of alcohol sales outlets/venues or the space given over to alcohol sales) increased from the 1980s to the mid-2000s and/or subsequently decreased, thereby explaining part of the rise and/or fall in alcohol-related harms.

Clinical changes

There are three theories here: that services in Scotland were less effective in preventing alcohol-related harms (e.g. in terms of the treatments available, the organisation of services

^h The potential for successful alcohol policy to increase problem drugs misuse is not considered in this paper but will be considered as a potential unintended consequence in any future MESAS work.

and the quality of services) during the 1980s and 1990s; that services improved in Scotland relative to E&W from around 2003; and/or changes in clinical coding created artefactual differences in the trends.

Our approach

We assessed the impact of policy prior to 2007 (when some of the actions in the 2009 strategy started) in Scotland and E&W, based on a comparison of the policies at that time with the evidence-base for effective alcohol policy.⁵

We undertook structured literature reviews for the social norms hypothesis and the substitution aspect of the alcohol market. For the social norms hypothesis we updated a 2008 commissioned review in this area⁶ as the basis for our findings. We searched Journals@Ovid Full Text and Embase for English language papers published from 2008 to June 2015 using a combination of: alcohol AND countr* AND (culture AND drinking) OR drinking culture. For substitution effects we undertook a search for English language papers published in Ovid Medline and Embase between January 2005 and July 2015, supplemented by papers held by the authors and identified through a rapid internet search. The database searches used a combination of the following terms: Alcohol AND (Substitute; Swap; Replace; Complement; Change; Demand; Supply; Alternative) AND (Drugs; Opioid-Related Disorders; Cocaine-Related Disorders/Cocaine; Cannabis; Methamphetamine/Psychotropic Drugs; Legal high; Designer Drugs) AND (Policy; Legislation). No restrictions were placed on the study types to be included. In both searches the identified references were screened for relevance and informally critically appraised during the synthesis of key points, putting greater emphasis on the highest quality and most relevant findings to Scotland.

We obtained Scottish alcohol outlet data from the Civil Judicial Statistics for Scotland reported in the Clayson report (1913–1972)⁷ and the Scottish Liquor Licensing Statistics (1980–2013) (refreshment and entertainment licenses were excluded).⁸ Scottish Liquor Licensing Statistics were similar/identical to British Beer and Pub Association (BBPA) Data.⁹ Scottish outlet data were available annually (1941–1972, 2000–2007, 2011–2013), biennially (2013–1939) or every ten years (1973–1991). English outlet data were obtained from Antoniadou and Thompson (2010), available annually (1955–1980, 2007–2010, 2012–2013), biennially (1982–2004) or quinquennially (1905–1950).¹⁰ On-trade outlets include public houses, hotels (including restricted hotels), restaurants (including restricted hotels) and registered clubs. Outlets are presented per 10,000 of total population.

There were no data available on trends in quality or quantity of health or social services (either preventative or treatment) for alcohol problems. In the absence of these, we assessed whether there have been important changes in service quality or quantity prior to 2007 in Scotland or in E&W. To assess whether changes in these areas might have played a role, we consulted seven key informants via e-mail who work with alcohol data in NHS statistical agencies across the UK or in clinical alcohol services (hepatology, addiction services, psychiatry) on the extent to which they perceived changes in service access, effectiveness, capacity, range of interventions, service availability, or clinical coding may have been

responsible for part of the observed trends. Finally, we synthesised the findings from this and the companion paper by summarising the balance of available evidence on the likely impact of each of the external factors and drawing this together into a narrative synthesis.

Results

Alcohol policy

Due to the existence of UK and Scottish legal systems, alcohol licensing policy in Scotland is governed by Scots law and in E&W by UK law. However, until devolution all Scottish legislation was agreed by the UK Government. The result has been very little divergence in licensing legislation until the 2000s. The latter half of the twentieth century was marked as a period of licensing liberalisation both in Scotland and E&W as on-trade opening hours were successively extended through the period.¹¹ It has further been argued that the aim of legislation, such as the relaxation of permitted hours for the off-trade from the 1960s and for the on-trade in the 2000s, was to support the alcohol trade.^{11–14} There was little divergence in licensing across Scotland and E&W until the 2005 Licensing (Scotland) Act, which for the first time recognised the role of licensing in protecting public health. One exception was slightly longer on-trade opening hours in Scotland between 1976 and 1988 which facilitated all day drinking by removing the afternoon break, but this seemed to have little impact.^{15,16} Given the overall liberalising thrust of licensing policy in Scotland prior to full implementation of the 2005 legislation (in 2009), it is unlikely that this has been a factor in the downward trends in alcohol-related mortality observed since 2003. However it is plausible that licensing policy pre-2009 in Scotland has contributed to the upward trends in alcohol-related harms since the 1980s. Further, given the minimal divergence in licensing policy across Scotland, E&W prior to then, it seems unlikely this has been a major factor in different trends in alcohol-related mortality observed across these regions.

Policies to tackle alcohol-related health harms were first introduced in the UK from the late 1980s, although again divergence in policy across nations was only possible after devolution in 1999. Alcohol harm reduction policy across the UK from the 1980s through to the 2000s mainly focused on actions unlikely to have had much impact on alcohol consumption and harms, such as health education campaigns.⁵ A notable divergence in Scotland was the additional funding provided via the Action on Alcohol Problems plan in the early 2000s, which predated the 2009 strategy, to produce and routinely publish data on alcohol-related harms. It has been suggested that this, and the changed media discourse highlighting the harms due to alcohol in society, were key factors in the subsequent introduction of an evidence-informed alcohol policy in Scotland in 2009. Subsequent legislative interventions also marked a clear divergence from E&W and from previous policy approaches. Given both the lack of divergence in harm reduction policy across the nations and the focus of these policies on less effective actions, it is unlikely that these policies contributed to the falls in alcohol-

related mortality observed between 2003 and 2007 in Scotland or to the difference in mortality trends observed between Scotland and E&W.

Alcohol social norms

Our review of the literature was limited by the lack of published research on Scotland's alcohol social norms (drinking norms). This has limited our findings to changes in the UK drinking norms and has meant we were unable to explore possible differences between the component nations within the UK in much detail. As Figure 2 in the comparator paper¹ illustrates, the social norms subsystem is influenced by wider socio-economic context and interacts with other subsystems to influence consumption and harms. We therefore comment on the factors which have likely contributed to changing drinking norms, and how this may contribute to a change in population consumption.

The UK drinking norms have long been characterised as one of heavy episodic drinking, or a 'dry' culture (where alcohol is not integrated into mealtimes).³ There is some evidence that Scotland may have a more concentrated drinking pattern as Scottish men were more likely to report higher unit consumption per occasion with fewer drinking occasions per week, compared to English peers.^{17,18} There is evidence that Scotland has also consumed a higher proportion of their alcohol from the off trade than E&W over the last 20 years.¹⁹ A number of changes in the UK's alcohol social norms have been identified over the last 30 years. The acceptability of female drinking has markedly increased in the UK, and elsewhere, believed to be driven by increased gender equality, female employment and financial independence of women.^{6,20–24} This change will likely have contributed to the observed increased female and population consumption of alcohol. The on-trade venues have also been transformed from male dominated public houses, to increasingly female and family-friendly spaces and there has been a proliferation of late night venues in urban centres targeting young adults.^{5,6,25–27} It is plausible that these changes have facilitated increased alcohol consumption in the on-trade amongst women and young adults. Alcohol consumption in the home became normalised in the late twentieth century. This has been reflected in the increased market share of the off-trade at a UK and Scottish level and may have contributed to the increased frequency of consumption.^{6,19,27,28} It has likely been driven by cost and the desire to 'preload' (drink alcohol at home prior to entering on-trade premises) for some,^{28–30} with others increasingly drinking alcohol with food or even viewing wine consumption as a form of cultural capital.³⁰ The type of alcohol consumed in the UK has also changed over the last 30 years, with the continued decline in beer and dark spirit consumption, an increase in wine³¹ and white spirit consumption, and a rapid rise and then fall of 'alcopop' (premixed drinks) consumption during the late 1990s and early 2000s.⁶ This move towards consumption of higher strength drinks may have contributed to the increased per capita alcohol consumption observed during the 1990s and early 2000s, facilitating higher unit consumption by individuals. There is some evidence of changing attitudes to alcohol during this period, which may have had a mixed influence on

consumption. The acceptability of alcohol in the workplace and regular day time drinking has decreased,^{6,27} but parents may have become more liberal in their approach to underage drinking.^{27,32} Survey data from the early 2000s suggests that drunkenness was seen as acceptable and alcohol was seen as an important part of British and Scottish culture, despite increased awareness and concern about alcohol-related harms, specifically crime and disorder.^{6,33}

It would appear that many of these social norm changes will have contributed to the increased per capita alcohol consumption in the UK observed over the latter half of the twentieth century. However, these trends are not simply explicable by collective changes in the whole population, as some have suggested.³⁴ Age, period and cohort analysis of cross-sectional survey data for Great Britain³⁵ found that the increased per capita consumption in the late twentieth century was due to successive, higher consuming birth cohorts born from the early 1900s through to early 1980s. The volume of alcohol consumed increased with each cohort up to the early 1980s, followed by declining consumption in younger cohorts. The prevalence of abstinence decreased for cohorts born up to the late 1960s followed by increases amongst more recent cohorts. A period effect on the mean weekly consumption amongst women was also observed with increases from the early 1990s onwards. There was also a clear age effect, with highest consumption reported during young adulthood and then decline in later life.^{35,36} These patterns suggest that drinking sub-cultures, with shared norms, can co-exist. For example, changes in the prevalent drinking norms during the latter half of the twentieth century seem to have influenced the drinking profiles of these higher consuming birth cohorts.^{5,23,24,37} Furthermore, lifetime drinking patterns seem to be established during youth, when individuals begin drinking.^{35,38,39} There has been little detailed exploration of the drivers of the reduced consumption in more recent birth cohorts, with speculation that it may be due to secular changes in how young people spend their leisure time or reduced access to alcohol for those aged <18 years.^{38,40} Evidence from other countries supports the idea that drinking sub-cultures can co-exist and overlap within countries amongst populations that share socio-economic, demographic or cultural traits.^{25,39,41–46} It seems plausible that changes in drinking norms differentially influence the alcohol consumption of sub-populations within the UK and that wider culture change contributed to the emergence of higher consuming birth cohorts from the 1960s to 1980s, which in turn contributed to increases in population consumption and alcohol harms from the 1980s through to the 2000s. Given that young adults are some of the highest consumers of alcohol, this further suggests that some of the falls in consumption since the mid-2000s in the UK are due to the more recent lower consuming birth cohorts who reached young adulthood during this period.

We are unable to determine whether the Scottish drinking norms differed substantially from UK norms during this time. It seems plausible that these UK level cultural trends have contributed to the observed trends in per capita alcohol consumption at a Scotland level also. We cannot determine however if differences in alcohol norms explain the differences in consumption and alcohol-related mortality trends

between Scotland and E&W, although the limited evidence of a tendency towards more concentrated alcohol consumption in Scotland may point to a possible explanation.

Alcohol market

As with most markets, the consumption of drugs varies in response to availability and price,⁴⁷ although their price elasticity of demand (how much demand changes in response to price changes) varies, with demand for some being less sensitive to price changes than others.⁴⁸ Polydrug use, and co-consumption of drugs with alcohol, is very common (with 80% of illicit drugs users in Scotland reporting the latter),^{48,49} Some drugs act as either substitutes or complements;^{50–52} therefore population level changes in some drugs may change levels of alcohol use.

Accurate data on the availability, price and consumption of illicit drugs prior to 1998 are almost entirely absent for Scotland. Between 2009/10 and 2012/13 (the years for which estimates are available), a stable 1.7% of the population aged 15–64 years in Scotland were found to be problem drug users.⁵³ Self-reported use of any illicit drug in the past year amongst all adults decreased from 7.6% to 6.2% between 2008/2009 and 2012/2013, with both cocaine and cannabis use decreasing.⁵⁴ The Scottish Schools Adolescent Lifestyle and Substance Use Survey (SALSUS) reported that the proportion of adolescents that had ever used drugs in 2014 was the lowest since the survey began in 1998 and there has been a general downwards trend since then, despite fluctuations in some years.^{55,56}

In contrast, drug-related deaths in Scotland increased from 244 to 613 between 1996 and 2014.⁵⁷ This may be partially explained by a cohort effect for individuals who have had lifelong exposure to drugs given that the mean age at death for drug-related deaths has steadily increased over time.⁵⁷ The percentage of drug-related deaths implicating alcohol has declined, from 40% to 19% of drug-related deaths from 2003 to 2013.^{57,58} The trends in drugs misuse in England are similar to Scotland.⁵⁹

Given that the consumption of illicit drugs is relatively low (and stable) in Scotland and E&W, and that consumption of possible complements for alcohol (cocaine and cannabis) are declining, it seems unlikely that changes in the consumption pattern of drugs could have played an important part in the recent decline in alcohol-related harms in Scotland.

Data on the availability of alcohol is limited to the number of licensed premises over time. The number of licensed premises in Scotland increased from the 1960s; the on-trade peaking in the early 2000s and the off-trade peaking in late 2000s (Fig. 1). Some of the recent change in the number of off-trade licensed premises per capita in Scotland might reflect changes in registrations occurring in response to the Licensing Act (part of the current alcohol strategy). E&W had notably higher per capita numbers of on-trade premises at the beginning of the 20th century. The trends in the two regions from the 1960s were similar suggesting similar legislative and societal environments, although the per capita increases of both on- and off-trade premises were greater in Scotland.

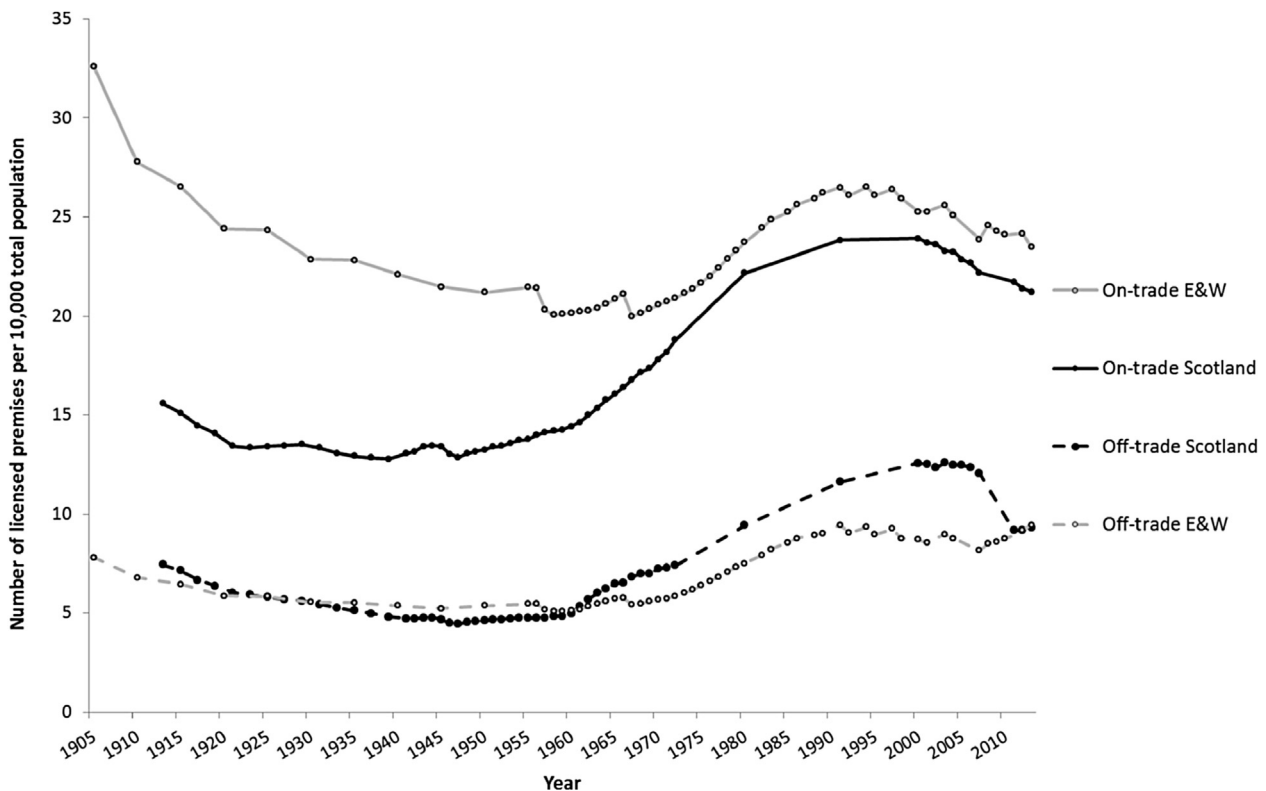


Fig. 1 – Number of licensed premises per capita in Scotland and England and Wales (E&W), on- and off-trade premises, 1905 to 2013 (on-trade includes registered clubs).

Table 1 – Summary of the evidence for each hypothesised external factor.

Hypothesis	Summary of the evidence
Socio-economic and demographic changes	<p>Modelled changes in incomes, particularly in the lowest income groups, predict part of the observed trends in harms in Scotland and the difference in trends to E&W.</p> <p>Lagged impacts of historical political and socio-economic changes could not be directly examined, but an observed age–period interaction is consistent with a vulnerable population experiencing a context in which alcohol consumption is high.</p> <p>Changes in the proportion of the population who are non-white could only explain a very small proportion of the difference in harms between Scotland and E&W.</p>
Policy	<p>Pre-2007 policy in Scotland is unlikely to have been sufficient to reduce alcohol-related harms.</p> <p>Policy in the rest of the UK after 2007 is unlikely to have been sufficient to reduce alcohol-related harms.</p>
Culture	<p>Changes in culture (which are likely to be due to changes in other determinants), particularly the trend towards drinking at home, might explain part of the increasing harms across the UK, but do not seem likely to be able to explain differences between Scotland and E&W except through interaction with other factors.</p>
Alcohol market	<p>Increased alcohol availability may explain part of the increase in alcohol-related harms across the UK, but is unlikely to explain the differences between Scotland and E&W.</p> <p>Substitution effects are unlikely to have resulted in changes in alcohol-related harms in Scotland.</p>
Clinical changes	<p>Changes to, or differences in, clinical service provision are unlikely to explain the trends in alcohol harms.</p> <p>Changes in clinical coding are unlikely to explain either the trends or the differences between Scotland and E&W.</p>

Clinical changes

There were no data available to empirically examine changes in service provision or quality prior to 2007, but none of the key informants we contacted identified any substantive change in service provision that could have been expected to have had a measurable impact in Scotland or in E&W either before 2003 or after. Note that this does not include any consideration of the impact of the more recent investment in alcohol treatment and care or Alcohol Brief Interventions (ABIs) which are part of the strategy and not deemed ‘external’ factors. They were also unable to identify any changes in clinical coding that may have generated a change in the trends. Examination of points of change from the International Classification of Disease (ICD) 9th to the 10th revision did not disrupt the trends, nor was there evidence of any change that alcohol codes were more likely to appear as an underlying (main) cause of death.

Discussion

Main results and synthesis

In this paper and its companion,¹ we have considered a range of factors external to those described in the 2009 alcohol Framework for Action which may help explain the declining

trend in most alcohol-related harms in Scotland and the differences in trends to E&W (Table 1).¹

Of those factors, the increases in incomes during the 1990s and the declining incomes in the poorest groups during the 2000s (acting probably through changes in alcohol affordability), seem likely to be an important, but partial, explanation for the trends in alcohol-related mortality in Scotland and E&W. We have been unable to fully test the potential for lagged impacts of political and socio-economic changes, but the identification of an age–period interaction is consistent with a susceptible population encountering a context encouraging consumption and so increasing harms (through increased consumption and/or due to a greater vulnerability to similar levels of consumption in comparison to E&W). It is unlikely that ethnicity differences between Scotland and E&W explain much of the differences or trends. It is plausible that increased alcohol availability (including more liberal licensing) and changing drinking norms (which will themselves have been driven by changes in licensing, affordability, advertising and the media), including a move towards drinking at home driven by the increasing availability of ever more affordable off-trade alcohol, could also have played a role in the rising trends in alcohol-related harms across the UK, but would only provide a plausible explanation for the differences between Scotland and E&W through the interaction with the trends in income or the lagged impacts of socio-economic change. It is also possible that there are some differences in how alcohol is

drunk (a more concentrated pattern, and more often at home in Scotland) which may be a consequence of other factors (such as affordability) or part of the reason for the higher mortality.

Other factors which we considered, including policy differences (other than the 2009 strategy), substitution effects and clinical changes all seem to be unlikely explanations for the observed phenomena.

It is important to note that the alcohol strategy from 2007 onwards in Scotland is likely to have contributed to the recent decline in alcohol-related harms: in particular through the ban on quantity discounting and to some extent through the provision of alcohol brief interventions and additional funding for specialist treatment and care services.⁶⁰ The relative contribution of the different aspects of the strategy will be considered in more detail as part of the MESAS evaluation programme.

Strengths and weaknesses

The identification of the key external factors was strengthened by the use of existing theory on the determinants of alcohol consumption and harms in the population.

Currently available licensing data only provide the number (rather than the capacity – floor space or shelf space) of premises. There is only limited literature on comparing social norms between Scotland and E&W, although the empirical data on sales and self-reported consumption do, to an extent, affirm what emerges from it. There is an absence of evidence in relation to the changes in clinical service provision over time, and the differences between Scotland and E&W, which limit our ability to draw conclusions about their importance in explaining trends, although it seems unlikely that the rise in alcohol-related mortality could plausibly be linked to such factors.

It would be possible to undertake more systematic literature reviews and perform empirical analyses of some factors (particularly around media discourse, the impact of migration from Eastern Europe, clinical factors, changing drinking norms, lagged effects and changes in the availability of alcohol) and future work may therefore be able to clarify the impact of these more clearly in the future.

Implications

If alcohol affordability increases again (as may have been the case with the recent reduction in alcohol duty), it might be expected that alcohol-related harms will start to rise in Scotland again. The implication of this is that policy to reduce alcohol affordability (whilst reducing poverty and income inequality), and policy to restrict the availability of alcohol more generally, remains important. If our hypothesis about the long term effects of earlier social, economic and political changes is true, it may also be the case that a new cohort of susceptible individuals is being created by the most recent recession and by changes to social security, who may in the future be at risk of alcohol-related harms.

Conclusion

These companion papers consider factors external to the current Scottish alcohol strategy and suggest that part of the rise and fall in alcohol-related mortality in Scotland and the differing trend to E&W are likely to be explained by changing incomes and alcohol affordability amongst the lowest income groups. Lagged effects from historical exposures may also be important in explaining the trends in Scotland. Increased alcohol availability may be important in the rise in alcohol-related mortality across the UK. Further reductions in alcohol-related mortality in Scotland will be more likely if future policy reduces alcohol affordability and availability, and socio-economic inequalities.

Author statements

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None declared.

REFERENCES

1. Reference paper 1.
2. Holder H. *Alcohol and the Community. A systems approach to prevention*. Cambridge: Cambridge University Press; 1998.
3. Room R, Osterberg E, Ramstaedt M, Rehm J. Explaining change and stasis in alcohol consumption. *Addict Res Theory* 2009;17(6):562–76.
4. Bickel WK, DeGrandpre RJ, Higgins ST. The behavioural economics of concurrent drug reinforcers: a review and reanalysis of drug self-administration research. *Psychopharmacology* 1995;118:250–9.
5. Brand DA, Saisana M, Rynn LA, Pennoni F, Lowenfels AB. Comparative analysis of alcohol control policies in 30 countries. *PLoS Med* 2007;4(4):e151.
6. Gordon R, Heim D, MacAskill S, Angus K, Dooley J, Merlot R, et al. *Snapshots of drinking. A rapid review of drinking cultures and influencing factors: Australia, Canada, France, Germany, Spain, Sweden, and the United Kingdom and Scotland*. Edinburgh: NHS Health Scotland; 2008.
7. Clayson. Departmental Committee on Scottish Licensing Law, Cmnd. 5354.
8. *Scottish liquor licensing statistics*. Edinburgh: Scottish Government. downloaded from, <http://www.gov.scot/Topics/Statistics/Browse/Crime-Justice/PubLiquor>; 2015. in September 2015.
9. *British Beer and Pub Association handbook 2014*. London: BBPA; 2014.
10. Antoniadou P, Thompson V. *Alcohol, entertainment and late night refreshment licensing, April 2009 – March 2010*. London: Department for Culture, Media and Sport, National Statistics Bulletin; Evidence & Analysis Unit; 2010.

11. Nicholls J. *The politics of alcohol. A history of the drink question in England*. Manchester: Manchester University Press; 2009.
12. Plant M, Allamani A, Massini G, Pepe P. Contextual determinants and alcohol control policies in the United Kingdom. *Subst Use Misuse* 2014;**49**:1576–88.
13. Nicholls J. Time for reform? Alcohol policy and cultural change in England since 2000. *Br Polit* 2012;**7**(3):250–71.
14. Plant M, Plant M. *Binge Britain. Alcohol and the national response*. Oxford: Oxford University Press; 2006.
15. Duffy JC, Plant MA. Scotland's liquor licensing changes: an assessment. *Br Med J (Clin Res Ed)* 1986;**292**:36.
16. Eagles JM, Besson JOA. Scotland's liquor licensing changes. *BMJ* 1986;**292**:486.
17. Ritson EB. National alcohol policy in Scotland. *Psychiatr Bull* 2001;**25**:409–11.
18. Bromley C, Shelton N. *The Scottish health survey: topic report UK comparisons*. Edinburgh: The Scottish Government; 2010.
19. Robinson M, Beeston C, McCartney G, Craig N. *Monitoring and evaluating Scotland's alcohol strategy: annual update of alcohol sales and price band analyses*. Edinburgh: NHS Health Scotland; 2015.
20. Waern M, Marlow T, Morin J, Ostling S, Skog I. Secular changes in at-risk drinking in Sweden: birth cohort comparisons in 75-year-old men and women 1976–2006. *Age Ageing* 2014;**43**(2):228–34.
21. Arie S. Problem drinking is rising among England's well educated women. *BMJ* 2015;**350**:h2610.
22. Andersen A, Rasmussen M, Bendtsen P, Due P, Holstein BE. Secular trends in alcohol drinking among Danish 15-year-olds: comparable representative samples from 1988 to 2010. *J Res Adolesc* 2014;**24**(4):748–56.
23. Bjork C, Thygesen LC, VintherLarsen M, Gronbaek MN. Time trends in heavy drinking among middle-aged and older adults in Denmark. *Alcohol Clin Exp Res* 2008;**32**(1):120–7.
24. Makela P, Tigerstedt C, Mustonen H. The Finnish drinking culture: change and continuity in the past 40 years. *Drug Alcohol Rev* 2012;**31**(7):831–40.
25. Gordon R, Heim D, MacAskill S. Rethinking drinking cultures: a review of drinking cultures and a reconstructed dimensional approach. *Public Health* 2012;**126**(1):3–11.
26. Measham F. The turning tide of intoxication: young people's drinking in Britain in the 2000s. *Health Educ* 2008;**108**:207–22.
27. Meier PS. Polarized drinking patterns and alcohol deregulation. *Nord Stud Alcohol Drugs* 2010;**27**:383–408.
28. Foster JH, Ferguson C. Alcohol 'pre-loading': a review of the literature. *Alcohol Alcohol* 2014;**49**(2):213–26.
29. Foster J, Karunanithi S, Woodward V. Why do people drink at home? *J Public Health* 2010;**32**(4):512–8.
30. Brierly-Jone L, Ling J, McCabe K, Wilson G, Crosland A, Kaner E, et al. Habitus of home and traditional drinking: a qualitative analysis of reported middle-class alcohol use. *Sociol Health Illn* 2014;**36**(7):1054–76.
31. M1 Stead, Angus K, Macdonald L, Bauld L. Looking into the glass: glassware as an alcohol marketing tool, and the implications for policy. *Alcohol Alcohol* 2014;**49**(3):317–20.
32. Valentine G, Holloway SL, Mark J. Generational patterns of alcohol consumption: continuity and change. *Health & Place* 2010;**16**(5):916–25.
33. Sharp C, Marcinkiewicz A, Rutherford L. *Attitudes towards alcohol in Scotland: results from the 2013 Scottish Social Attitudes Survey*. Edinburgh: NHS Health Scotland; 2014.
34. Skog OJ. The collectivity of drinking cultures – a theory of the distribution of alcohol consumption. *Br J Addict* 1985;**80**:83–99.
35. Meng Y, Holmes J, Hill-McManus D, Brennan A, Meier PS. Trend analysis and modelling of gender-specific age, period and birth cohort effects on alcohol abstention and consumption level for drinkers in Great Britain using the General Lifestyle Survey 1984–2009. *Addiction* 2014;**109**:206–15.
36. Britton A, Ben-Shlomo Y, Benzeval M, Kuh D, Bell S. Life course trajectories of alcohol consumption in the United Kingdom using longitudinal data from nine cohort studies. *BMC Med* 2015;**13**:47.
37. Kraus L, Tinghog ME, Lindell A, Pabst A, Piontek D, Room R. Age, period and cohort effects on time trends in alcohol consumption in the Swedish adult population 1979–2011. *Alcohol Alcohol* 2015;**50**(3):319–27.
38. Herring R, Bayley M, Hurcombe R. "But no one told me it's okay to not drink": a qualitative study of young people who drink little or no alcohol. *J Subst Use* 2014;**19**:95–102.
39. Gustafsson N. Changes in alcohol availability, price and alcohol-related problems and the collectivity of drinking cultures: what happened in southern and northern Sweden? *Alcohol Alcohol* 2010;**45**(5):456–67.
40. Pennay A, Livingston M, MacLean S. Young people are drinking less: it is time to find out why. *Drug Alcohol Rev* 2015;**34**(2):115–8.
41. Danielsson A, Wennberg P, Hibell B, Romelsjo A. Alcohol use, heavy episodic drinking and subsequent problems among adolescents in 23 European countries: does the prevention paradox apply? *Addiction* 2012;**107**(1):71–80.
42. Beccaria F, Rolando S, Ascani P. Alcohol consumption and quality of life among young adults: a comparison among three European countries. *Subst Use Misuse* 2012;**47**(11):1214–23.
43. Landberg J, Hubner L. Changes in the relationship between volume of consumption and alcohol-related problems in Sweden during 1979–2003. *Alcohol Alcohol* 2014;**49**(3):308–16.
44. Kim W. Drinking culture of elderly Korean immigrants in Canada: a focus group study. *J Cross-cultural Gerontology* 2009;**24**(4):339–53.
45. Cook WK, Caetano R. Ethnic drinking cultures, gender and socioeconomic status in Asian American and Latino drinking. *Alcohol Clin Exp Res* 2014;**38**(12):3043–51.
46. Ilomaki J, Kornhonen MJ, Lavikainen P, Lipton R, Enlund H, Kauhanen J. Changes in alcohol consumption and drinking patterns during 11 years of follow-up among ageing men: the FinDrink study. *Eur J Public Health* 2010;**20**(2):133–8.
47. Caulkins JP, Nicosia N. What economics can contribute to the addiction sciences. *Addiction* 2010;**105**:1156–63.
48. Petry NM, Bickel WK. Polydrug abuse in heroin addicts: a behavioural economic analysis. *Addiction* 1998;**93**(3):321–35.
49. *The road to recovery: a new approach to tackling Scotland's drug problem*. Edinburgh: Scottish Government; 2008.
50. Petry NM. Effects of increasing income on polydrug use: a comparison of heroin, cocaine and alcohol abusers. *Addiction* 2000;**95**(5):705–17.
51. Petry NM. A behavioural economic analysis of polydrug abuse in alcoholics: asymmetrical substitution of alcohol and cocaine. *Drug Alcohol Dependence* 2001;**62**:31–9.
52. Sumnall HR, Tyler E, Wagstaff G, Cole JC. A behavioural economic analysis of alcohol, amphetamine, cocaine and ecstasy purchases by polysubstance misusers. *Drug Alcohol Dependence* 2004;**76**:93–9.
53. Information Services Division. *Estimating the national and local prevalence of problem drug use in Scotland 2012/13*. Edinburgh: ISD Scotland; 2014.
54. *Scottish crime and justice survey 2012/2013*. Edinburgh: Scottish Government; 2014.

-
55. Black C, Martin C. *Multiple substance use among adolescents in Scotland: profile and trends*. Edinburgh: IPSOS Mori and Scottish Government; 2015.
 56. *Scottish schools adolescent lifestyle and substance use survey (SALSUS): drug use among 13 and 15 year olds in Scotland 2013*. Edinburgh: NHS National Services Scotland; 2014.
 57. *Drug-related deaths in Scotland in 2014*. Edinburgh: National Records for Scotland; 2015.
 58. Barnsdale L, Gordon R, McAuley A. *The national drug related deaths database (Scotland) report: analysis of deaths occurring in 2013*. Edinburgh: NHS National Services Scotland; 2015.
 59. *Statistics on drug misuse: England 2014*. Health and Social Care Information Centre; 2014.
 60. Beeston C, Geddes R, Craig N, Gordon R, Graham L, McAuley A, et al. *Monitoring and evaluating Scotland's Alcohol strategy: fourth annual report*. Edinburgh: NHS Health Scotland; 2014.